

CLAIMS:

We claim:

- Sub
A15
- 10
- 15
- 20
1. A method for forming at least one patterned layer on a substrate comprising the steps of:
 - providing a rotatable stamp having relief geometries on its surface to define a stamping surface;
 - applying ink to the surface of the rotatable stamp to define an inked stamping surface;
 - rotating the rotatable stamp as the substrate is placed in contact with the stamp to impress an inked pattern on the substrate as defined by the inked stamping surface; and
 - patterning the substrate by etching material from or depositing material on the substrate, wherein the inked stamping surface guides the etching or depositing of material in a geometry to define the patterned layer useful in fabricating an electronic device.
 2. The method of claim 1 further comprising the step of passing the substrate to a mechanism for removing the inked pattern from the substrate.
 3. The method of claim 1, in which the step of providing the rotatable stamp comprises:
 - (a) casting a liquid onto a surface having relief geometries thereon;
 - (b) solidifying the liquid to define a solid film; and

(c) rolling a member over the solid film so that the solid film is lifted from the surface and bonds to the member.

4. The method of claim 3, in which the liquid comprises an elastomeric material, the step of solidifying the liquid comprises curing the elastomeric material to form an elastomeric film.

5. The method of claim 4, further comprising a step of exposing the cured elastomeric film to oxygen plasma before the member is rolled over the film.

6. The method of claim 1 in which the substrate is a multi-layered film including at least one coating layer.

7. The method of claim 6 in which the at least one coating layer includes a thin layer of gold or silver.

8. The method of claim 1 in which the step of patterning the substrate comprises etching material from the substrate applying an etchant selected from aqueous ferri/ferrocyanide, $K_4Fe(CN)_6$, $K_3Fe(CN)_6$, $Na_2S_2O_3$, and KOH in H_2O .

9. The method of claim 1, in which the step of rotating the stamp provides an exposed region on the substrate where substantially no ink is present and a protected region on

the substrate where ink substantially covers the substrate, and the step of patterning the substrate comprises etching material from the substrate at the exposed region or depositing of material on the substrate at the exposed region.

5 10. The method of claim 9 in which the substrate is a multi-layered film including a metallic layer and the step of patterning the substrate comprises etching the metallic layer from the substrate at the exposed region.

Sub A3
10 11. The method of claim 10, in which the substrate further has an adhesive layer applied to the metallic layer selected from Ti and Cr.

Sub B6
12. The method of claim 2 in which the mechanism applies ultraviolet light, heat, or wet chemical means to the substrate to remove the inked pattern.

Sub A4
13. A method for forming at least one layer on a substrate for use in fabricating an electronic device, the method comprising the steps of:
 providing the substrate in the form of a flexible sheet;
 providing a rotatable stamp mounted on an axle, the stamp having an outer surface with relief geometries to define a stamping surface;
20 rotating the rotatable stamp on an inking pad to apply ink to the stamp and define an inked stamping surface;

rotating the rotatable stamp as the substrate is placed in contact with the stamp so that an inked pattern corresponding to the inked stamping surface is formed on the substrate, and passing the substrate to an apparatus for etching material from or depositing material on the substrate, wherein the inked stamping surface guides the etching of the material or
5 depositing of the material in a geometry that defines a pattern on the substrate.

14. The method of claim 13, further comprising the steps of attaching the sheet at one end to a first reel and at the other end to a second reel so that the sheet may be passed from the first reel, to the rotatable stamp, and to the apparatus by unwinding the sheet from the first
10 reel and winding the sheet onto the second reel.

15. The method of claim 13, in which the inking pad is cylindrical, and the steps of rotating the cylindrical stamp on the inking pad and rotating the cylindrical stamp as the substrate is placed in contact with the stamp are performed substantially simultaneously to
15 provide for substantially continuous rotary printing.

16. A transistor fabricated with the method of claim 1 wherein the patterned layer has a resolution of about 30 μm or smaller.

20 17. A transistor fabricated with the method of claim 13 wherein the patterned layer has a resolution of about 10 μm or smaller.

18. ~~An integrated circuit comprising one or more transistors according to claim 1.~~

add AS
Ab
A1
A8